Chapter 5. Implementation and Costs

The estimated costs for implementation of the MSFMP are grouped into two main categories: 1) enforcement and 2) ongoing management and research. These costs estimates were produced by projecting the time to perform certain tasks such as the enforcement of regulations, collection and analysis of data, and review of documents. Generally, these cost projections are underestimated because there is no way to determine how difficult some issues may be. Nevertheless, estimates are useful for projecting costs and for comparing different options. These cost estimates include expenditures that are incurred regardless of whether or not the MSFMP is partially or fully adopted. These expenses are termed "sunk" costs and equate to the costs of enforcement, data collection, research and monitoring that the Department must perform as part of its resource stewardship charge.

5.1 Enforcement

Enforcement activities within the Department are coded to programs, such as the Marine Life Management Act (MLMA) and Marine Life Protection Act (MLPA) rather than a specific species or fishery. This makes it difficult to determine the accurately estimate enforcement costs in any individual fishery.

Although no enforcement officers are strictly assigned to the squid fishery, it is estimated that 8% of an officer's time is spent on squid enforcement (J. Gross pers. comm.). The majority of the enforcement takes place at the peak times of the fishery. Within the major squid landing ports (Moss Landing, Monterey Bay, Port Hueneme, Ventura, San Pedro, and Terminal Island) there are nine lieutenants and 20 wardens. Enforcement takes place on land, at the point of landing and at squid processors, and at sea using the Department's five patrol boats and nine patrol skiffs.

The 8% estimate is further supported by landings data. In 2001 and 2002, the number of squid landings, as compared to all landings, was 8.3% for the major squid ports (identified above). This is assumed to equal an estimated 8% of enforcement time spent on squid (squid landings: 6,100; total commercial landings: 73,200 commercial landings for the major squid landing ports).

Using this value (8%), the estimated annual costs for enforcement in the squid fishery was determined as follows:

Staffing summary: 9 lieutenants, 20 wardens	
Annual enforcement costs (including operating expenses):	$2,500,000
Percent estimate of squid enforcement	x 8%

Total annual enforcement cost:	$ 200,000

5.2 Ongoing Management and Research

In 1998, fishery managers, researchers, and statisticians from the Department and NOAA Fisheries met to develop both fishery-dependent and fishery-independent sampling and monitoring programs for market squid. During this meeting, goals were identified and a series of sampling protocols were developed to attain data necessary to expand existing knowledge of basic market squid biology, life history, and commercial fishing activity (CDFG 2001c).

To acquire better information on squid taken in the California fishery, the Department developed a monitoring system to track variations over the season in squid length, weight, sex and maturity, and to accurately profile the State's commercial market squid fishery by tabulating catch data on a daily basis. Additional efforts to improve identification of the vessels participating in the fishery, characterize the use of gear to take squid, and determine the number of vessels using each gear type, fishing and landing patterns, market value, and product distribution, were undertaken as well.

Efforts to achieve these goals and to better manage the market squid fishery required the implementation of different programs. As part of the development of the monitoring system, a port sampling program was established in 1998 to collect fishery and biological data. Research cruises conducted by the Department and by outside contractors since 1998 have provided vital information about spawning habitats and egg production. In 1999, a logbook program designed to collect information on effort in the fishery was developed and implemented, where both roundhaul and light vessels provide information on their catch and effort during each day of fishing activity. The purpose of this program was to increase the amount and accuracy of data collected and to supplement the landing receipt program already in place. The estimated costs of these programs are separated into fishery-dependent monitoring and fishery-independent research.

Additional management tasks include the Department's responsibility to communicate fishery information to stakeholders on a timely basis. This may require preparation and mailing of newsletters or letters and the creation and maintenance

of internet web pages. Also, the Department needs to communicate with an advisory committee (if formed), the Commission, and the general public.

5.2.1 Fishery-Dependent Monitoring

Collection of fishery-dependent biological data is authorized under FGC §8010. Written fishing records (logbooks) are required under FGC §8026, and CCR Title 14 §140 and §149. The use of landing receipts is required under FGC §8043. The costs of fishery-dependent monitoring can be broken down into two parts: 1) the port sampling program and 2) the logbook and the landing receipt program.

- Fishery-dependent samples are taken from squid landings at the three major port areas (Monterey/Moss Landing, Santa Barbara/Ventura/Port Hueneme, and San Pedro/Terminal Island). There is a monthly goal of 25 samples from each southern port and 20 samples from Monterey. One sample is taken every day each week, and an additional sample is required on two randomly chosen days of the week. A sample consists of 30 squid randomly selected from one vessel. Samplers observe at least half of the load and collect squid throughout the observation time. Samplers also interview the captain to learn where the vessel fished, how many sets were made, if a light boat was used, size of the catch, and any anecdotal information. Samples are not collected when there are no landings.

  The samples are processed in the lab to collect information on length, weight, sex, and gonadal condition. Statoliths and a sample of mantle tissue are taken from the first male and first five females of every sample. Gonads are preserved from the first five females of every sample. The estimated annual costs for these activities are as follows:

  Staffing Summary: 2 Personnel Year (PY) Laboratory Assistants, 3.5 PY Temporary Help

Staff:	$160,000
Annual operating expenditures:	69,000
Total annual costs:	$229,000

- The Department's statistical database and landing receipt and logbook programs provide vital information about the squid fishery. The estimated annual costs associated with the collection and maintenance of this information are as follows:

  Staffing Summary: 1 PY Marine Biologist, 1 PY Temporary Help

Staff:	$ 85,000

Annual operating expenditures:	$19,000
Total annual costs:	$104,000

5.2.2 Fishery-Independent Research

As part of the legislatively directed initial three year study (April 1998-2001, SB 364), approximately $240,000 annually was directed toward scientific research efforts outside the Department via contracts with the University of California. The objectives of these projects were to develop and evaluate applications of escapement and depletion modeling strategies to the California market squid fishery, obtain better information on squid life history, explore the stock structure of the squid population, and improve understanding of the relationships between age, growth, maturity, and fecundity. Some of the contract efforts required fishery-independent sampling aboard fishery research vessels, which provided a valuable basis for future science-based management strategies that may be used in lieu of proposed regulatory measures developed from catch information alone.

Within the Department, research cruises focused on collecting fishery-independent data have been undertaken. Annual trawl cruises from 1998 to 2001 have been used in development of egg escapement models, specifically to capture female squid to increase the robustness of the current model. Other research cruises have utilized a remotely operated vehicle (ROV) to characterize market squid spawning habitat, including the depth and temperature where egg cases are deposited as well as to develop an index of egg case abundance. The ROV cruises have been conducted twice a year to coincide with peak squid fishing activity. The estimated annual costs for continuing the Department fishery-independent research are as follows:

Staffing Summary: 1 Personnel Year (PY) Associate Biologist, 2 PY Marine Biologists, 0.25 PY Senior Biologist

Staff:	$219,000
Annual operating expenditures:	215,000
Total annual costs:	$434,000

5.3 Summary of Estimated Annual Costs of Implementation

Managing the fishery and developing an estimation of optimum yield will require continued monitoring and collection of fishery-dependent and fishery-independent data. Fishery-dependent biological data and fishery-independent biological data are necessary to estimate population size and reproductive success. Edited logbook and landing receipt data can be used to monitor trends in the fishery and estimate fishery effort.

The estimated annual cost of market squid enforcement is $200,000. Additional regulations for the squid fishery presented through this management plan are expected to require additional enforcement effort and cost that has not been estimated. Presently, there is no funding specified to offset these costs. Monies should be designated to properly fund the enforcement of the market squid fishery management plan. The estimated annual cost for ongoing and future research in the market squid project, including statistical data, fishery-dependent, and fishery-independent sampling is approximately $964,000. Current levels of funding are estimated at $533,000, which excludes all research that the Department was previously conducting. The funding for these operations is from the Fish and Game Preservation Fund.

The following is a summary of the estimated annual costs of full and partial implementation:

Description	Full Program	Partial Program
Enforcement	$200,000	$200,000
Fishery-dependent monitoring:		
Port sampling	$229,000	$229,000
Logbooks/landing receipts	$101,000	$104,000
Ongoing management and research		
Research surveys	$ 434,000	-
Total Implementation Expenses	$964,000	$533,000